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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,373	01/30/2001	Hiroaki Etoh	JP919990295-US1	1535

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EXAMINER	
NALVEN, ANDREW L	

ART UNIT	PAPER NUMBER
2134	

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/772,373	ETOH ET AL.	
	Examiner	Art Unit	
	Andrew L Nalven	2134	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 January 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-19 are pending.

Drawings

1. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Claim Rejections - 35 USC § 103

2. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith "Stack Smashing Vulnerabilities in the Unix Operating System" in view of Cowan et al "StackGuard : Automatic Adaptive Detection and Prevention of Buffer-Overflow Attacks." Smith describes elements of Unix memory management and methods of preventing stack smashing. Cowan discloses methods of detecting and preventing buffer overflow attacks.

3. With regards to claims 1, 4, 8-11, and 13, Smith teaches a return address storage area for storing a return address for the source call for the execution of a currently active function (Smith, Page 12 Figure 7.1.b, Page 10 Paragraph 4), previous frame pointer storage area storing a previous frame pointer to said calling source for the execution of a currently active function (Smith, Page 12 Figure 7.1.b, Page 10 Paragraph 4), and local variable storage area to be located below said return address

storage area and said previous frame pointer storage area (Smith, Page 12 Figure 7.1.b, Page 10 Paragraph 4). Smith fails to disclose the use of a guard variable. Cowan discloses that when a data array is stored in a local variable area, a guard variable is stored in a location preceding the data array and the guard variable is used as target to confirm whether said return address has been destroyed (Cowan, Page 8 Figure 2 "Canary Word", Page 8 Paragraphs 1 and 2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to utilize Cowan's guard variable to detect the destruction of a return address with Smith's described Unix stack system because it offers the advantage of providing a method of preventing buffer overflow attacks on an any program compiled with Cowan's specialized compiler (Cowan, Page 3, Paragraphs 4 and 5).

4. With regards to claim 2, Smith as modified teaches a character string stored in the local variable storage area in the memory pattern of the memory device (Smith, Page 16 Figure 9.c) and a guard variable preceding the character string (Cowan, Page 4 Figure 1).

5. With regards to claim 3, Smith as modified teaches a random number being employed as a guard variable that is stored in a local variable storage area in the memory pattern of the device (Cowan, Page 9).

6. With regards to claims 5 and 15, Smith and Cowan teach everything disclosed above and Cowan further teaches a stack protection instruction preparation unit for receiving a source program and for adding to the source program an instruction for storing a guard variable (Cowan, Page 6 Paragraph 1, Page 3 Paragraph 5, Page 8

Paragraph 1). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to utilize Cowan's stack protection instruction preparation unit to insert a guard variable to detect the destruction of a return address with Smith's described Unix stack system because it offers the advantage of providing a method of preventing buffer overflow attacks on an any program compiled with Cowan's specialized compiler (Cowan, Page 3, Paragraphs 4 and 5).

7. With regards to claims 6, 12, 14, and 16-18, Smith as modified teaches that when the destruction of the guard variable is discovered during the function return process (Cowan, Page 7 Paragraph 1) the stack protection execution unit performs an abnormal end process to halt the execution of the program and to notify a user of an occurrence of a stack smashing attack (Cowan, Page 13 Paragraphs 2-3, Smith Page 21 Paragraph 3).

8. With regards to claim 7, Smith as modified teaches the stack protection instruction preparation unit being mounted in a compiler that processes the source program written in a compatible language (Cowan, Page 6 Paragraph 1) and when translated adds an instruction for the storage of the guard variable (Cowan, Page 7 Figure 3, Page 3 Paragraph 5).

9. With regards to claim 19, Smith as modified discloses all that is described above, but fails to disclose a transmission means for reading and transmitting a program. Examiner takes official notice that the reading and transmission of programs is well known in the art and thus at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to provide the ability to transmit a program

because it offers the advantage of allowing the execution of a program at a remote location.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Yarom US Patent No. 5,949,973 discloses a method of relocating the stack in a computer system for preventing overwriting by an exploit program.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew L Nalven whose telephone number is 703 305 8407. The examiner can normally be reached on Monday - Thursday 8-6, Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Morse can be reached on 703 308 4789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew Nalven

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